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OUTLINES OF DENTAL PATHOLOGY

BY

LOUIS OTTOFY, D. D. S.

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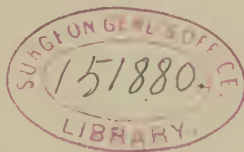
OF

DENTAL PATHOLOGY

BY

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PREFACE.

IN the preparation of these "Outlines" the author has freely quoted from all sources, and for this privilege he is truly grateful.

The literature of Dental Pathology finds its limits only in the entire permanent and periodical literature of Dentistry. It is impossible for the student to have access to all, and especially to the most recent views of the profession, as expressed in the latest periodicals. An Outline contemplates to aid the student only to that extent which will enable him to find the most reliable with the least loss of time, and to omit study of that which is obsolete. If so much is gained by this unpretentious work, it will truly gratify

THE AUTHOR.

CHICAGO, February 20, 1895.

REFERENCES.

THE numbers at the end of each lecture refer to the following books and periodicals. As a rule, only those are mentioned which may be readily consulted by the student:

1. Harris' Principles and Practice of Dentistry. Twelfth edition. 1889.
2. Transactions of the World's Columbian Dental Congress. 1894.
3. Micro-organisms of the Human Mouth. Miller. 1890.
4. Smale and Colyer's Diseases and Injuries of the Teeth. 1893.
5. Parreidt's Compendium of Dentistry, translated by Louis Ottofy. 1889.
6. American System of Dentistry. Vol. I. 1886.
7. Bödecker's Anatomy and Pathology of the Teeth. 1894.
8. Dental Surgery, including Special Anatomy and Pathology. Henry Sewill. 1890.
9. The Diseases of the Mouth in Children. F. Forchheimer. 1892.
10. American System of Dentistry. Vol. II. 1886.
11. Blodgett's Dental Pathology. 1888.
12. A System of Dental Surgery. Charles S. Tomes. 1887.

OUTLINES OF DENTAL PATHOLOGY.

LECTURE I.

INTRODUCTORY.

1. Define Pathology.

A. Pathology is the science that treats of the diseased functions of the body.

2. Define Dental Pathology.

A. The science that treats of the diseased functions of the teeth. The term Oral Pathology is frequently used to denote the science that includes the diseased functions of the oral cavity or the mouth. In the generally accepted sense of the term, Dental Pathology includes the science of all the diseased functions of the body which properly come under the care of the dentist.

3. Name the parts of the body which properly embrace the domain of the general dental practitioner.

A. The teeth, gums, mucous membrane of the oral cavity, salivary glands, maxillæ, tongue and contiguous parts.

4. How are pathological conditions produced?

A. By mechanical injuries, loss of vitality and micro-organisms.

5. What do recent investigations prove regarding the presence of micro-organisms in the mouth?

A. That there are always present in the mouth countless numbers of micro-organisms or bacteria. Over one hundred varieties have been found; of these six or eight are always present.

6. What are the sources of nourishment of bacteria in the mouth?

A. Saliva, mucus, dead epithelium, dental tissue softened by decay, exposed pulps, exudations of the gum and accumulation of particles of food.

7. Why is the neglect of pathological conditions in or about the mouth fraught with more than usual danger?

A. The face is composed of a large number of bones, forming numerous complicated cavities, which are intimately connected with, or in dangerous proximity to, the interior of the cranium.

8. What means are adopted to correct pathological conditions?

A. Surgical and therapeutical.

9. Name some conditions of the individual which must be taken into consideration in the treatment of disease by surgical or therapeutical interference.

A. Temperament, age, sex, physical development, education, inherited tendency to disease, etc.

10. How are the human temperaments classified?

A. Bilious, sanguineous, nervous and lymphatic.

11. Do we ever find an individual in whom either of these characteristics appears unmixed?

A. No. Every person's temperament is made up of two or more of the above basal classes, but whichever of them predominates is said to be the temperament of that individual.

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- No. 1. P. 165.
- No. 2. P. 301.
- No. 3. Pp. 37. 68.
- No. 10. P. 1031.

LECTURE II.

SALIVA AND SALIVARY CALCULUS.

12. Describe the normal characteristics of mixed human saliva.

A. Colorless liquid, usually slightly clouded by epithelium, more or less slimy, slippery, viscous, the latter being furnished by the sub-maxillary and sub-lingual glands, that of the parotid is more dilute. Normally of a weak alkaline or neutral reaction, specific gravity 1.002 to 1.006.

13. Name a most frequent pathological condition of the saliva.

A. Acidity. When the teeth are surrounded by an acid fluid, their destruction is hastened, because the acids affect the teeth chemically, and because the bacteria of the mouth seem to thrive better in an acid medium.

14. What is ptyalism?

A. The normal secretion of the saliva is variously placed at from fifty to one hundred ounces per day; during ptyalism this may be increased to ten times the quantity named.

15. What are some of the causes leading to ptyalism?

A. The administration of mercury, dentition, neuralgia, ulceration of the mucous membrane of the mouth, etc. A similar effect can be produced by the administration of calabar bean, digitalin, pilocarpin, etc. The excessive flow may be arrested by the administration of such drugs as atropine, while nicotine in small doses excites the flow of saliva. When ptyalism is due to an attempt on part of the

system to rid itself of some injurious drug, the presence of the latter in the mouth often exerts a deleterious influence on the teeth and the gums.

16. What effect is exerted by a diseased condition of the saliva on the remainder of the system?

A. Deranges the digestive system, causes malassimilation of food, gastric eructations, etc.

17. What effect has any gas containing ammonia on the saliva?

A. It causes a precipitation of the lime salts which are always in solution in the saliva. The deposit usually takes place upon the teeth.

18. What other cause may lead to the deposition of lime salts upon the teeth?

A. Faulty assimilation. The teeth may be suffering for want of the inorganic principles, and yet large quantities of these same substances may be deposited on the exterior of the teeth.

19. What are these deposits, and of what do they consist?

A. They are known as salivary calculus, or, commonly, tartar. They consist principally of lime salts and of particles of food and organic matter.

20. What are the principal objections to its presence?

A. The mouth can not be in a healthy, cleanly condition. The margins of the deposit irritate and finally inflame the gums, and result in ulitis. The destruction of the soft tissues is followed by the destruction of the bony sockets of the teeth, and the teeth are finally lost from want of support. The fluids of the mouth become vitiated.

21. What is the remedy?

A. Thorough removal, first scaling the teeth, then polishing the surfaces, occasionally painting the gums with a mixture of equal parts of iodine paint (saturated solution of iodine in alcohol), tincture of aconite root and chloroform is of advantage. Sometimes when the teeth are very loose, they should be ligated.

22. What are the most frequent diseases of the salivary glands and their ducts?

A. The glands are subject to inflammation, suppuration and abscess; the ducts are liable to inflammation as a result of the introduction of foreign bodies, and the formation of calculi within them.

23. Name the special characteristics of saliva in different individuals.

A. In some persons the flow of saliva is scant, while in others it is profuse; it is sometimes thin and watery, at other times viscid, ropy and tenacious. During the performance of dental operations its flow is sometimes checked by pressure upon the ducts, or collected on napkins, cotton, bibulous paper or punk, or prevented from reaching the territory involved in operation by means of the rubber dam, and when the quantity secreted is excessive, it is removed from the mouth by means of ejectors.

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| No. 4. | Pp. 306-311. |
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LECTURE III.

MUCOUS MEMBRANE AND GUMS.

24. Define the mucous membrane and the gums.

A. The mucous membrane lines all parts of the oral cavity except the crowns of the teeth. The gums slightly differ in their structure from the remainder of the mucous membrane. By the term "gums," that part of the mucous membrane which covers the bony structures of the mouth is designated.

25. Describe Stomatitis.

A. Stoma, mouth; itis, inflammation; or inflammation of the mucous membrane of the mouth. It makes its appearance by elevated patches, sometimes extending over the entire surface of the oral cavity. When it is superficial, with little swelling, it is called erythematous, in which case there is redness, heat and considerable tenderness; acute pain when deep in tissue; portions of the epithelium become opaque, accompanied by an appearance of whiteness in streaks or patches; superficial ulcerations sometimes occur; copious flow of saliva, impaired taste, difficulty in mastication; whitish fur on tongue. Causes: Irritation of any local character; constitutional causes, such as fever, teething, etc.

26. Name the causes and symptoms of acute Catarrhal Stomatitis.

A. It appears in children, connected with dentition; in adults, from mechanical irritants; acid reaction of saliva; extremes of heat and cold; due to exanthema; improper hygienic conditions; poor food; effects of mer-

cury. Symptoms: Redness, heat, pain and swelling; pain, burning and smarting; fever; anorexia; diarrhœa, with flatulence; impaired taste; may extend to fauces; difficult swallowing; ptyalism; excoriation of corners of mouth; sordes; furred tongue.

27. Describe chronic Catarrhal Stomatitis.

A. The stroma is involved and structural changes occur; the connective tissue of the stroma becomes infiltrated with exudations from vessels; the mucous membrane is indurated and thickened; the mucous glands encysted and granular; the papillæ of the tongue are swollen; disagreeable oral secretions; sordes on teeth.

28. Give the treatment.

A. For simple stomatitis of children, emollient washes, such as slippery elm or pith of sassafras in cold water; when severe, solution of acetate of lead (three grains to an ounce of water); bromide of potassium to relieve nervous excitement and fretfulness; borax and honey, or borax and glycerine, or weak solution of alum. For catarrhal stomatitis: Remove the cause or causes of irritation; alkaline washes, or dilute solution of chloride of zinc (one grain to the ounce of water), or of nitrate of silver (same strength). Phenate of soda as a wash or spray; or carbolic acid, one drachm, oil of wintergreen, two drachms, oil of peppermint, three drachms, as a spray.

29. Describe a case of Aphthous Stomatitis.

A. This disease is sometimes designated as "follicular stomatitis," or "canker sore mouth." It appears first as small, whitish, vesicle-shaped elevations on the inner surface of the lower lip, near the frænum of the tongue, or on the inside of the cheeks, sometimes on the tongue; the vesicles are surrounded by an inflamed ring at the base, and when they break they leave a gray surface which heals slowly; the ulcers are shallow and very painful, but cause little or no constitutional symptoms. Common to

adults, and women during the time of pregnancy and lactation.

30. What is its treatment?

A. Small doses of rhubarb, or citrate of magnesia and tonics; locally, nitrate of silver, or nitric acid applied on the sharp end of a wood toothpick, chlorate of potassium solution, alum, borax.

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- No. 5. P. 147.
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LECTURE IV.

MUCOUS MEMBRANE AND GUMS.

31. Describe a case of Ulcerative Stomatitis.

A. It begins in the gums and extends to the cheeks; the gums are congested, and have a bluish, swollen appearance; the surface of the mucous membrane is covered with exudation of pus, fibrin, epithelial scales, and micro-organism; eventually the grayish-white exudation gives way and the underlying tissue, as well as the mucous membrane, loses its vitality and sloughs off; the teeth loosen and drop out; the bone becomes affected in extreme cases; it is common to children of from one to ten years, who are exposed to bad hygienic conditions.

32. Give the treatment.

A. Constitutional: Mild purgative, cod liver oil and syrup of lacto-phosphate of lime, tincture of chloride of iron and quinine. Local: Nitrate of silver, chloride of zinc, or carbolic acid washes, fresh air, nourishing diet, etc.

33. Describe the disease known as "Thrush," "Sprue," or "Muguet."

A. The inflamed parts soon become coated with small whitish points, which coalesce, forming patches. They vary in color, but generally remain moist and clear; the exudation is at first closely adherent and then peels off to be replaced by fresh exudation; vegetable fungi exist, the parasites developing in acid secretions, and hence thrush occurs where oral secretions are vitiated and only by addition of vegetable parasites. The disease is common to emaciated children, and in adults follows typhus, malarial

and other fevers, and the last stages of consumption; there is also decided gastric intestinal disturbance.

34. Give the treatment.

A. First neutralize the acid conditions to destroy the fungi; also regulate the bowels with rhubarb, or some other mild laxative, and bicarbonate of potash; a grain of quinine every three hours (for infants), iron with quinine, as a tonic; locally apply wash of permanganate of potash, one grain to one ounce of water.

35. Describe Gangrenous Stomatitis.

A. This disease is variously known as "gangrene," "cancrum oris," "canker of the mouth," and "noma." It is a serious disease affecting unhealthy children, and is constitutional in character. The cellular tissue of the cheeks becomes infiltrated with pus and fibrin to such a degree as to become thickened and indurated on the inside, and the skin externally becomes tense and glistening, it is then followed by ulceration and gangrene; the mucous membrane of the cheek presents a dark appearance surrounded by a red inflammatory border, the dark portion soon sloughs and forms an ulcer with a ragged, uneven border, the ulcer is covered with a dark-brown deposit. Eventually the soft parts and the bone become involved, and decomposition leads to the formation of sulphuretted hydrogen which gives the breath a fetid odor. It is often fatal, pyæmia occurring, followed by hemorrhage, exhaustion and death.

36. Name the treatment.

A. It should above all things be prompt and energetic; internally give chlorate of potash, five to ten grain doses every four hours, and tonics to keep up the strength; the parts should be sprayed with chlorinated soda, or carbolyzed water; the chief hope is to prevent the ulcer from assuming a phagedenic character; it should be destroyed with strong nitric acid, nitrate of silver, acid

nitrate of mercury, bromine or concentrated hydrochlorid acid.

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- No. 8. P. 289.
- No. 10. Pp. 513, 516, 531.
- No. 12. P. 731.

LECTURE V.

MUCOUS MEMBRANE AND GUMS.

37. Describe Syphilitic Ulceration of the mouth.

A. It is the result of constitutional syphilis; the initial sore is generally superficial, not often irritating, discharges but little pus; at times the sore is phagedenic, the glands of neck swollen and enlarge. The most common location of the ulcer is on the tip or side of tongue, tonsil, or inside the corner of the mouth on the mucous membrane.

38. Name the treatment.

A. All rough edges of the teeth removed, apply, with a camel's-hair brush three times a day, a solution of ten grains of chromic acid to one ounce of water. In severe cases constitutional treatment is indicated. Abstinence from the use of tobacco and alcoholic drinks is essential. Dental operations should be postponed, if possible, until the local symptoms have abated. *Especial* cleanliness of the person and the instruments of the operator are imperative.

39. Describe a case of Mercurial Stomatitis.

A. This disease is due to the effects of mercury (salivation). The symptoms are: Soreness, inflammation and sponginess of the gums about the necks of the teeth (usually the inferior incisors are affected first); ulceration; fetid breath; increased salivary secretion; swelling of the salivary glands; slight fever; muscular pains; loss of flesh; coppery taste, ulceration, stiffness of jaws, extension of the effects from the gums to the mucous membrane of the mouth and palate; sore throat; the ulceration then becomes

marked about the necks of teeth, the teeth become loose, often profuse hemorrhage follows; sloughing may occur, and the bone of the jaw may be laid bare; in extreme cases death from exhaustion ensues.

40. What is the method of treatment?

A. Discontinue the use of mercury, administer dilute sulphuric acid with bitter tonics; or five-drop doses of tincture of belladonna three or four times a day, or iodide of potassium. Locally, tincture of iodine and water in equal parts; gargles of a strong solution of bichlorate of potassium, tannic acid, borax, etc. After the action of the mercury has subsided, scarify the gums. The fetor is quickly corrected by permanganate of potash, or charcoal in water.

41. Describe a case of Scurvy or Scorbutus?

A. The gums become spongy, the breath offensive; livid spots appear on the skin; there is general debility; the countenance becomes pale and bloated. The disease is gradual in approach. Attention is attracted by the unhealthy paleness, languor, despondency, indisposition to bodily exercise, fatigue and weariness. The gums become red, swollen and tender, and are inclined to bleed. Later the face becomes paler, sallow and dusky. Lip and tongue are pallid; finally the gums become livid, purple, especially at their margins. They rise between and around the teeth. The breath is offensive. Purplish spots and blotches appear on the entire body, beginning with the lower extremities, extend to the trunk, arms and neck, but seldom to the face. Frequently hemorrhage from the nose, gums and mouth takes place; sometimes the stomach, intestines and urinary passages also become thus involved. The feet and legs are swollen and painful. The general debility increases; the slightest muscular exertion may be attended with palpitation of the heart, vertigo, dizziness and a feeling of faintness. If the disease continues, these symptoms become even more aggravated. The complexion is livid,

has a leaden hue; the gums are greatly swollen, and put forth a black, fungous growth to such an extent as to conceal the teeth; blood oozes from them; sloughing takes place, the necks of the teeth are laid bare, and, in bad cases, the cheeks are also affected. The teeth become loose and fall out; patient cannot masticate; the breath is intolerable. Hard, painful tumefactions appear on the limbs, thigh, the lower jaw and hand; stiffness of the joints sets in, especially of the knee-joint. The debility becomes dangerous, the patient sometimes dies on suddenly rising from bed. The disease is considered to be due to a lack of vegetables and fruits. It seems to be due to the absence from the blood of certain principles, especially potash.

42. Name the treatment.

A. Constitutional and local. Same as for mercurial stomatitis. In addition, administer vegetable acids, lemonade, etc. Nitrate of potash, two drachms; acetic acid, eight ounces. Tablespoonful three times a day.

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- No. 4. Pp. 290, 297.
- No. 5. P. 148.
- No. 10. P. 386.
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LECTURE VI.

MUCOUS MEMBRANE AND GUMS.

43. Mention the special characteristics of the gums.

A. But little can be ascertained regarding the gums by a casual inspection. They are susceptible to the usual morbid influences, subject to the general laws of health and vary with the state of general health, the condition and arrangement of the teeth. The cause of disease may be specific as in the case of the presence of salivary calculus, carious, devitalized, loose or irregular teeth, or the vitiated state of the fluids of the mouth. The general health influences the extent of the local irritation. Normally the gums are of a pale rose color. But there may be extensive variation in the color within physiological limits. The general appearance and physical structure is influenced by the general health and the habits of the body.

44. What is the condition of the gums in persons suffering from general anæmia or chlorosis?

A. Gums are bloodless and pale, sometimes in a condition resembling œdema. The condition is sometimes transient, follows pregnancy, typhoid fever and other diseases.

45. Describe hyperæmia of the gums.

A. Red, swollen and bleeding on slightest provocation. Condition is due to poisoning with mercury and other mineral poisons. Poorly fitting artificial teeth, presence of salivary calculus, etc.

46. What is ulitis?

A. Ulitis is erroneously termed *gingivitis*; the Latin word "gingiva" (gum) should not be combined with the Greek

termination "itis," signifying inflammation. It is an inflammatory condition due to local and constitutional causes.

47. Describe acute ulitis.

A. Occurs in connection with stomatitis and acute inflammation of the oral mucous membrane. It does not involve the fibro-cartilaginous structure. Due to irritation of dentition or periodontitis. The treatment is the same as in the case of stomatitis.

48. Describe chronic ulitis.

A. May exist for years without resulting in suppuration or recession. Gums become loosened, festoons are thick and spongy. Sensibility increases, bleeding results from the slightest causes. May be due to the presence of salivary calculus, loose teeth in which the pulps are devitalized, aching, carious or irregular teeth or roots. Venereal disease, scorbutic tendency or mercurial treatment. Perverted condition of the secretions of the mouth, etc.

49. Give the treatment.

A. Remove the cause, whether of local or constitutional origin. Scarify the gums. Excise hypertrophied portions of it. Tonic mouth washes are indicated, with the addition of astringents and antiseptics. Solutions of peruvian or white oak bark. In mild cases saturated solution of glycerine and iodine; borax and honey. In severe cases touching the margins of the gum with nitrate of silver in water, one to three or even six grains to the ounce. Or chloride of zinc in the same proportion.

50. What is suppuration of the gums?

A. It is formed either superficially along the borders caused by the accumulation of tartar or as an abscess in the connective tissue. Generally due to abscesses connected with the roots of teeth. Sometimes to the presence of foreign bodies, such as splinters of bone, tooth-brush bristles, etc., in connection with micro-organic infection.

51. What is hypertrophy of the gums ?

A. The gums become considerably increased in size, are generally nodulated, of a darker color than normal and bleed freely on the slightest touch. In children the hypertrophy appears coincident with the cutting of the teeth ; if left alone the hypertrophy of the gums increases so that the teeth may become completely hidden. Such a condition will give rise to great difficulty in mastication. Hypertrophy of the gums may arise from badly fitting dentures, or from continued irritation from tartar ; but in these cases the hypertrophy of the gums is never so great as in the congenital condition.

52. What is the treatment ?

A. The treatment consists in not only removing the excess of gum, but also the affected alveolus. Cases treated in this way generally do well, but if paring of the gum is simply resorted to, recurrence of the trouble is likely to take place. When due to irritation from plates, the cause should be removed, and this, with the application of an astringent solution, will generally prove sufficient.

53. Describe hypertrophy of the oral mucous membrane.

A. As a result of the loss of teeth, and the failure to supply the loss by means of artificial substitutes, the muscles of the cheeks are abnormally exerted in maintaining the food for the purpose of mastication, on the narrow alveolar border ; this exertion results in an increase of the tissues of the mucous membrane, sub-mucous tissue and the muscles themselves, until the hypertrophied tissue almost fills the space previously occupied by teeth.

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- No. 4. P. 287.
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- No. 8. Pp. 288, 289.
- No. 10. P. 549.
- No. 12. Pp. 705, 726.

LECTURE VII.

MUCOUS MEMBRANE AND GUMS.

54. Describe a polypus.

A. Polypus of the gum is the name given to local hypertrophies of that tissue, the result of irritation. It is, therefore, generally found in connection with the ragged edge of a cavity or stump, and may be brought about by the presence of tartar or even irritation from a clasp or some other portion of an artificial denture. In character and microscopical appearance a polypus resembles the gum tissue. The growth really starts as a simple hypertrophy of the gum; this increases, becoming pedunculated, and if the cause is not removed, may increase so as to simulate an "epulis;" but from this it can be distinguished by the fact that the epulis will spring from the periosteum, the polypus from the gum. When the polypus encroaches upon the cavity of a tooth it may grow so as to completely fill it, and when it has reached the surface of the cavity, will come in contact with the opposing teeth, this often causing ulceration and great pain. In the cavity of a tooth the growth has to be diagnosed from a polypus of the pulp. This is not difficult, as in one case the pedicle of the growth will be in connection with the pulp chamber, while in the other it can be traced to the gum between the teeth. The polypus of the pulp is not painful to the touch, while that of the gum is generally exquisitely so.

55. What is the treatment?

A. The treatment consists in removing the source of irritation, but it is generally advisable to snip off the growth as well; or, in the case where it is in connection

with a cavity, it is sometimes useful to remove the growth with nitric acid, nitrate of silver, or with the electrical cautery. The cervical margins of the cavities must be carefully trimmed and care taken to see that fillings do not overlap at this point, and so leave a source of irritation.

56. Describe epulis.

A. An epulis is a fibroma of the gum or fibrous epulis ; it generally springs from the periosteum covering the septum between two contiguous teeth. These epulides are of slow growth, and by their pressure separate the adjacent teeth : but when arising near a root, they tend by their growth to completely cover it. In character they resemble the normal gum, and on examination will generally be found pedunculated.

57. What is the treatment ?

A. Treatment consists in removing the tumor, and taking especial care to cut away the portion of bone from which it springs. The pedunculated part can be first removed, and then with suitable instruments, such as a bone gouge, enamel chisels and coarse burs used with the dental engine, the septum of the bone between the teeth is cut away. Some recommend the removal of one or both of the adjacent teeth at the same time, but this is seldom necessary. Cases are usually cured without this radical measure if care is taken in removing the septum of bone, but should growth recur then it would be better, perhaps, to sacrifice the tooth, the only reason for this being that it will allow the bone to be removed more efficiently. After removal the wound should be swabbed with chloride of zinc, and a mouth wash containing some aseptic given, chloride of zinc, three grains to one ounce of water, being as valuable as any.

58. What is myeloid sarcoma ?

A. Myeloid sarcoma, or myeloid epulis, is not nearly so common as the fibrous variety. In character these

epulides are softer, more vascular, have a dark grey color, mottled with purple-colored spots looking somewhat like a mulberry.

59. Give the treatment.

A. The treatment consists in free removal, not only of the growth, but of the adjacent bone, and naturally in these cases where the growth is part of more extended trouble, major operations such as the removal of large portions of the bone are indicated.

60. What are papillomata?

A. Papillomata may be considered as very rare growths upon the gums. They arise from hypertrophy of the papilla of the gum. The growth presents all the appearance of papillomata in other parts of the body.

61. What is the treatment?

A. Removal by excision.

62. Describe epithelioma of the gums.

A. Epithelioma of the gums is generally of the squamous variety, although the columnar is at times seen attacking the lower jaw. When starting in the gums it is due to some long continued irritation, such as a ragged edge of a tooth or a badly fitting denture. The disease is insidious, and often its presence is only recognized by the fact that after extraction the socket of the tooth does not show any tendency to heal. The ulceration spreads, involving the adjacent tissues, and is characterized by eversion of the edges and induration of its base. In the upper jaw the growth of the epithelioma takes place principally in the direction of the antrum, so that the external appearances may be but slight.

63. Give the treatment.

A. The treatment consists in freely incising the diseased parts; the success of the operation depends upon the

thoroughness with which it is carried out, and no hesitation must be shown in resecting a portion of the lower jaw, or removing the maxilla if necessary.

64. What are the indications of lead poisoning as shown in the gums?

A. Chronic lead poisoning affects the gums in a very characteristic manner by causing a blue or slate-colored line upon them. It is more frequently seen upon the lower than the upper gums and in the incisor more than the molar region. In addition to the blue line, other symptoms of lead poisoning will generally be present, such as colic and wrist drop, due to paralysis of the extensor muscles of the wrist. In rare cases the blue line may be present and yet no other symptoms exist; under such conditions one should carefully eliminate other causes.

65. Give the differential diagnosis.

A. The blue line is diagnosed from, 1, a delicate line of blue found at the margin of the gums and teeth, but not involving the gums, and occurring in people exposed to white lead dust for a few hours. This deposit disappears on rinsing the mouth, and is only lead sulphide deposited upon, and not in the substance of, the gum. 2, A deposit under the margin of the gum, occurring in patients who clean their teeth with charcoal. 3, A deposit similar to 2, this latter occurring in people exposed to carbon dust, such as miners. 4, The line caused by copper and bismuth poisoning. 5, A blue line caused by a thin layer of black tartar. It must be noticed that the line is absent if teeth are not present, and also it is more marked when there is present a source of irritation around the necks of teeth, such as calculus.

After treatment, by removing the patient from his surroundings, the line disappears, generally within a period of three or four weeks, or, in more severe cases, in three months or longer. The inner side of the cheek opposite often shows discolored patches of mucous membrane.

REFERENCES:

- No. 1. Pp. 245, 249.
No. 4. P. 298.
No. 5. Pp. 85, 116.
No. 8. Pp. 254, 325.
No. 10. P. 745.
No. 11. P. 132.
No. 12. Pp. 717, 721.

LECTURE VIII.

DENTITION.

66. What does the term "dentition" imply?

A. The emergence of the teeth from the alveoli and gum, teething.

67. What is first and second dentition?

A. The former is the emergence of the deciduous, temporary or milk teeth; the latter, the emergence of the permanent teeth.

68. What is so-called "third" dentition?

A. The emergence of teeth at an advanced age which do not belong to the first or second dentitions, and which cannot be classed as malformed teeth; the teeth of third dentition are said to be imperfectly developed. There are no truly authentic cases on record.

69. Is dentition naturally a pathological or a physiological process?

A. It is a physiological process.

70. When may dentition be considered morbid?

A. When it is performed with difficulty, and attended with serious and occasionally alarming effects.

71. What are the symptoms of morbid or difficult dentition?

A. The skin is hot; the gums are red and swollen; considerable fever; frequent diarrhoea; eruption on the head and face; ulcerations on the lips and inside of the cheeks, on the gums and on the tongue; itching of the

nose; twitching of the muscles; disturbed sleep; general wakefulness; dilatation of the pupils; loss of appetite; great thirst; irritability of temper; convulsions; and at times death.

72. Why is the body predisposed to disease during the period of first dentition?

A. On account of the increased susceptibility to nervous and digestive troubles, slight causes producing serious effects.

73. In what organs are important changes occurring in the organization of the infant at such a period?

A. In the stomach and intestinal tract.

74. What common causes may bring about an abnormal dentition?

A. Exposure to cold, indigestion, and any derangement of health.

75. What does the degree of irritation depend upon in such cases?

A. Upon the number of teeth emerging simultaneously, although one tooth may, in some instances, cause more irritation than a number will in others.

76. When the teeth are about to erupt, what benefit is derived from the increased flow of saliva?

A. It keeps the mouth moist and cool.

77. What are the usual indications of the emergence of teeth?

A. Increased heat, redness, swelling and hardness of the gums, an increased flow of saliva, and later a peculiar whiteness caused by the pressure of the tissue of the advancing tooth.

78. How may convulsions be brought on by the irritation of teething?

A. By the superior and inferior maxillary divisions on the fifth pair of nerves conveying the painful impressions to the brain, and through it by the motor nerves acting of the voluntary muscles, causing muscular contractions.

79. When the absorption of the tissues proceeds in proportion to the development of the teeth, what is the result?

A. Little or no irritation, as slight pressure only is exerted.

80. What effect has health and strength upon dentition?

A. It may progress with less irritation, and in all such cases the irritation is better borne.

81. What effect have the seasons on dentition?

A. Dentition progresses easier in winter than in summer as the child during the winter is not so much predisposed to certain affections peculiar to the hot months.

82. To what is the irritation of an eruptive tooth due?

A. To the downward pressure of the developing root upon the nerves and vessels, owing to the difference in the growth of the tooth and the absorption of the tissues over it.

83. How may the respiratory system indicate its disturbance?

A. By cough, catarrh, bronchitis, pneumonia, or spasmodic croup.

84. How may the alimentary canal indicate it?

A. By nausea, vomiting, loss of appetite, diarrhœa.

85. How does the skin indicate it?

A. By such symptoms as eczema, acne, etc.

86. What should be the rule during the period of first dentition?

A. The mouth should be examined daily, and be washed

out with pure cold water; pure air, cleanliness, proper food and clothing, are also indispensable.

87. What is the treatment for tenderness and swelling of the gums?

A. Demulcent and soothing lotions, such as mucilage of acacia, marshmallow, or flaxseed; mild astringent lotions, such as borax and honey in equal parts; if much restlessness, a small quantity of paregoric may be added to the lotion, or may be administered separately. Ulceration may be treated by the light application of nitrate of silver or hydrochloric acid in honey of roses.

88. Why is diarrhœa a common accompaniment of dentition?

A. Because at this period the follicular apparatus of the intestines is developing, increased sensitiveness and proneness to indulgence in improper food, or overfeeding, etc., and reduced digestive power.

89. What form of diarrhœa may be regarded as an effort of nature to relieve irritation?

A. Watery, though frequent, stools, differing but little except in consistence and frequency from the natural evacuations.

90. What form of diarrhœa is regarded as most unfavorable?

A. Evacuations of greenish matter in a dirty-brown, offensive fluid mixed with purulent mucus and blood; the putridity due to the decomposition of the albumen in the serum.

91. What is a favorable prognosis?

A. Thicker and more homogeneous stools, although very offensive.

92. What is the treatment for diarrhœa of dentition?

A. Correct diet, if improper; prevent exposure to cold. For simple cases a teaspoonful of equal parts of castor oil and gum syrup, several times a day. For severe cases, one to three drops of wine of opium added to the castor oil and gum syrup emulsion; or camphorated tincture of opium ten to thirty drops, first giving one or two teaspoonfuls of aromatic syrup of rhubarb. When great emaciation, add two or three drops of brandy. If much vomiting, two or three drops of sal volatile; also diminish the quantity of food, but let the child have food more frequently, warm applications to the abdomen, such as poultices of linseed meal, to which a little mustard may be added, until the skin is slightly reddened.

93. What is the treatment of convulsions of dentition?

A. Place the child in warm bath; lance the gums; and such therapeutical treatment as chloroform or hydrate of chloral as abortives, carefully administered; an emetico-cathartic, such as syrup of ipecac, combined with a half grain of calomel.

94. Describe the method of lancing the gums.

A. Let the nurse be seated on a low chair holding the child across her lap so that its head may come between the knees of the operator who is seated a little higher, when the child may be held securely.

95. What form of incisions should be made with the lancet?

A. When possible an oval section of the gum corresponding with the cutting edge of the incisors and cuspids should be removed, a crucial incision or cutting out a section of the gum over the grinding surfaces, for the molars.

96. What are the indications against lancing the gums?

A. Hemorrhagic or mercurial diathesis. The hemorrhage can be controlled by giving the breast, ring, or some hard substance, the application of styptics; the internal

administration of chenopodium or erigeron; placing infant in erect position; hot foot-bath.

REFERENCES :

See end of Lecture IX.

LECTURE IX.

DENTITION.

97. What is the treatment of cutaneous eruptions?

A. For erythematous eruptions, starch mixed with cold water to the consistence of cream will relieve the irritation and itching. When on the head, castor oil may be applied, and a wash of a dilute solution of borax in water. When the crust is large, a poultice of linseed meal followed by an astringent lotion. For acute eczema, powdered oxide of zinc dusted over the part; for a thick purulent discharge, a salve of equal parts of vaseline and lead plaster, or a salve of five grains of oxide of zinc to one ounce of simple salve.

98. What is the process of the eruption of deciduous teeth?

A. It is a double process, consisting of the elongation and advancement of the teeth to the surface, and coincident absorption of the overlying tissues. The alveolar borders dissolve away at their approximate edges, and a wide opening is made; the roots, lengthening, press upon the overlying gum, which becomes thinner until the cusps of the tooth can emerge.

99. Do the lower teeth precede the upper of the same class?

A. As a rule, but sometimes this order is reversed.

100. Are the teeth erupted in pairs or groups?

A. They are, with an interval between the different groups, but there is no absolute uniformity as to time or order of eruption.

101. Are the roots of teeth completed at their emergence?

A. They are not; instead of the finished conical termination, they present an unfinished large concave extremity, with sharp margins, occupied by the voluminous pulp.

102. What is the best food for infants?

A. Milk from the breast of a healthy mother.

103. What if child is weaned?

A. Milk, oat-meal, wheaten grits, barley flour, rice, farina, sago, bread crumbs, yolk of egg and milk, chicken or mutton broths.

104. After the first year of age?

A. Bread and butter, baked potatoes, and ripe fruit may be gradually added.

105. What is the effect of premature extraction of deciduous teeth?

A. Imperfect mastication; imperfect development of the jaws; possibility of irregular position of the permanent teeth.

106. What effect has the premature extraction of the deciduous molars?

A. Injury to the bicuspid.

107. How long is the preservation of the deciduous teeth especially necessary?

A. Up to the ninth or tenth years.

108. What is the effect of the premature extraction of the deciduous cuspids?

A. Irregularity of the permanent cuspids.

109. What is the effect of the premature extraction of the deciduous second molar?

A. The first permanent molar moves forward and there is not sufficient space for the anterior permanent teeth.

110. What is the effect of the removal of the first permanent molar before the tenth year?

A. Irregular arrangement of the teeth yet to be erupted.

111. If the first permanent molar is removed after the eleventh or twelfth year, what is the effect?

A. The space is never perfectly closed, and the adjoining teeth, especially the second permanent molar, may lean toward the vacancy, and this tipping over is further increased by the occlusion in mastication; the gum is likely to recede, and the process to absorb, the teeth are not as useful in mastication as they should be and sometimes become painful and loose, and are eventually lost.

112. When the loss of the first permanent molar is inevitable, at what time should it be removed?

A. Just before the eruption of the second permanent molar, when the latter may take its place and the occlusion be uninjured.

113. Does much irritation attend the eruption of the permanent teeth?

A. It does not, except in case of the third molars, as the tissues offer but little resistance, and the child is stronger and less susceptible to irritation.

114. Are newly erupted permanent teeth firm in their sockets?

A. They are not, and are therefore easily turned from a proper position in the arch.

115. What causes the destruction of the roots of the deciduous teeth?

A. A process of absorption due to the action of a secretion from a fleshy mass or tubercle developed from the sac of the permanent.

116. What is the fleshy tubercle composed of?

A. Nucleated cells and free nuclei; it is very delicate, and of slight thickness, and very vascular.

117. What effect has the loss of vitality of a deciduous tooth upon the absorbent action of this tubercle?

A. Its action ceases.

118. What may the difficult eruption of the inferior third molar be due to?

A. Want of space between the second molar and the ramus of jaw.

119. What is the treatment for difficult eruption of the third molar?

A. Administration of saline laxatives, local application of heat over the gums where the tooth is in the course of eruption. Cutting away of the gum tissue over the tooth, and in some cases cutting away the bone covering the tooth; this should be done with burs used in the dental engine. Prescribe one grain of the sulphite of calcium to be taken every ten minutes until six grains have been taken, then one grain every fifteen minutes until four have been taken, then one grain every half hour until four have been taken, making fourteen grains in four hours, and during this treatment, in the most severe cases, the patient should be instructed to lie down and large cloths of hot water should be applied as hot as can be borne; the cloths should be changed every few minutes, and should be large enough to cover the entire side of the head, face and neck.

REFERENCES:

- No. 1. P. 174.
- No. 4. P. 2.
- No. 5. Pp. 11, 35, 148.
- No. 8. Pp. 28, 48.
- No. 9. P. 124.
- No. 11. Pp. 35, 136.
- No. 12. Pp. 1, 38, 74.

LECTURE X.

ABNORMALITIES OF THE SIZE AND NUMBER OF THE TEETH.

120. In what respect are teeth characteristically different from bone?

A. Every tooth has a crown portion exposed, while bone is covered by periosteum and surrounded by cartilage. The structure of the teeth is much harder than that of bone ; the cavity of a tooth contains a pulp, while that of bone contains marrow ; the development and growth differ. The duration of the teeth is less than that of bone, and once during life they are renewed.

121. What advantage is derived from the conical shape of the roots of the teeth?

A. It enables them the better to bear the shock of occlusion and mastication, gives more stability, and renders them easier of removal.

122. To what is the strength of attachment of the teeth due?

A. To each having a separate alveolus, divergence or convergence of roots and connection with the peridental membrane and gum.

123. Is an abnormal shape more common to the roots or to the crown of the teeth?

A. To the roots.

124. What teeth are more commonly irregular in position?

A. The cuspids.

125. What teeth are more commonly malformed ?

A. The third molars.

126. What are odontomes ?

A. Masses of dental structure which result from a morbid condition of the formative pulp.

127. What are supernumerary teeth ?

A. Irregular teeth which exceed the normal number and do not belong to either dentition.

128. Where do they appear and how are they recognized ?

A. Supernumerary teeth may spring up during the second dentition in any part of the alveolar arch, and the forms of such teeth may either resemble those of special members of the normal series, or they may deviate from each of the recognized forms and assume a somewhat irregular conical shape, sufficiently characteristic in itself to be at once recognized as that of a supernumerary tooth.

129. What is the principal disadvantage of teeth of abnormal size ?

A. Teeth, though individually well shaped, may be so much above or below the ordinary size that they become disfiguring to the possessor.

130. What are supplemental teeth ?

A. More than the number of regular teeth of each class, such as two superior lateral incisors on one side of the arch.

131. What are geminous teeth ?

A. Two teeth fused together with a common pulp.

132. What is meant by an osseous union of teeth ?

A. Teeth joined together by a fusion of their cementum, but with separate pulps.

133. What are attached teeth ?

A. Teeth joined together by a strong connection of their periodental membrane.

134. What are nodular teeth?

A. Teeth, to the necks of which small nodules composed of enamel and dentine are attached.

135. What are exostosed teeth?

A. Teeth with enlarged roots, due to the hypertrophy of the cementum.

136. What are dentine excrescences?

A. Small nodules of osteo-dentine connected with the pulp, called pulp nodules.

REFERENCES :

- No. 1. Pp. 107, 383.
- No. 4. Pp. 9, 31.
- No. 5. P. 17.
- No. 8. P. 49.
- No. 12. Pp. 30, 102.

LECTURE XI.

EROSION, ABRASION, ATTRITION.

137. What is erosion?

A. Erosion may be described as a gradual disappearance of a portion of the substance of a tooth, leaving behind a polished surface, the cause being obscure. The appearance produced by erosion varies considerably. It more frequently attacks the anterior teeth, and it nearly always occurs upon the labial surface, though in rare instances it may occur upon the lingual. It is said to be commonest upon the upper cuspids and lower bicuspid; but this is probably due to abrasion. True erosion is probably commoner upon the central and lateral incisors. In some cases it is found that most frequently the erosion produces a V-shaped-like cut, the apex of the V being towards the axis of the tooth. In these instances the situation is near the level of the gum. In others it appears as a cup-shaped depression upon the labial surface, or it may produce grooving upon the approximal surface. Sometimes the teeth look as if they had been pared down with a knife in a direction sloping from the labial to the lingual surfaces, and when the mouth is closed a considerable interval is left between the upper and lower teeth. The eroded surface is hard, polished, and often very sensitive. Erosion nearly always commences in the enamel, but it may begin in the cementum.

138. What is the cause of erosion?

A. The cause of erosion is obscure, for nothing quite definite or satisfactory has yet been advanced to account for all the appearances produced.

139. What is the treatment of erosion?

A. The treatment of erosion is unsatisfactory. In the early stages the use of an alkaline mouth wash should be advised, as also the local application of spirits of ammonia and spirits of wine. A soft tooth-brush should be used and tooth powder discontinued, an aseptic solution being used instead. If the eroded spots are painful, they may be touched with phosphoric acid, chloride of zinc, or, if in a place which does not show, nitrate of silver may be used. When the erosion is more advanced, the cavity should be shaped and a filling inserted, preference, in the front of the mouth, being given to gold.

140. What is attrition?

A. Attrition is the wearing away of the tooth substance caused by mastication. It is more frequently in the teeth of the old, and in the temporary teeth of the young. The amount of attrition depends to a great extent upon the character of the food, the density of the tooth substance, and the articulation. It may attack the surface of all the teeth or affect only one or two teeth. When localized, it is generally due to some irregularity of the bite.

141. What is the treatment?

A. In the majority of cases treatment is not necessary. In those where the posterior teeth are absent and the anterior ones are being worn away through bearing the brunt of mastication, dentures should be inserted, and arranged in such a way that the bite is taken off the front teeth. In some cases the patient will refuse to submit to dentures; under such circumstances, the progress of the destruction can be arrested by filling the cavity with gold, bringing the filling over the edges of the enamel in such a way that in occlusion the gold fillings come in contact, and consequently the progress of tooth destruction is arrested. This treatment is most effectual, but the appearance produced is somewhat unsightly. Gold and platinum foil is less unsightly and wears better.

142. What is abrasion ?

A. By abrasion is understood destruction of the tooth substance through friction from a foreign body, such as a denture, pipe or tooth-brush. (Some authors would include attrition and abrasion together.) Abrasion is more likely to be mistaken for erosion than attrition. It may occur on nearly any tooth and is frequently caused by the presence of a clasp. The prominent parts of the curves of the arch are more likely to be affected. Again, this condition is at times more marked upon the left than the right side, probably from the tooth-brush being used transversely, and from the fact that in a right-handed person more force would be applied in cleaning the left rather than the right side. That this seems to be the explanation is shown by the fact that in left-handed patients the destruction of the tooth is more marked upon the right side than the left.

REFERENCES :

- No. 1. P. 355.
- No. 4. P. 277.
- No. 5. P. 44.
- No. 7. Pp. 309, 316.
- No. 8. P. 294.
- No. 11. P. 167.

LECTURE XII.

HYPERÆSTHESIA AND HYPERÆMIA OF DENTINE.—EXPOSURE OF PULP.—PULPITIS.

143. What does the tissue of the dental pulp consist of?

A. Connective tissue group, supplied with many blood-vessels and nerves.

144. What are the processes of the odontoblasts or dentine forming cells?

A. Dentinal fibrillæ.

145. What is in close connection with each odontoblast?

A. A nerve branch.

146. How is the impression made on the protoplasm of the odontoblasts through injury of the fibrillæ, communicated to the sensorium?

A. By means of the fine nerve filaments found everywhere in the periphery of the pulp; and sensation follows lines of pathological changes.

147. Why has the dentine no need of nerves?

A. Owing to the peculiar arrangement of the odontoblasts and their processes, the dentinal fibrillæ; the cells being in physiological relation to the sensory nerve endings, the conditions for the translation of injury to protoplasm into sensation are complete.

148. Do such considerations account for hyperæsthesia of dentine and injury to the dental pulp by irritation of the fibrillæ?

A. Yes.

149. What is required to make up the sum of the sensory function of the tooth?

A. The pulp and peridental membrane.

150. What does the sense of touch wholly reside in?

A. The peridental membrane, which receives the impression of even the slightest touch upon any part of surface of the tooth.

151. From what does the dentine derive its sensory function?

A. Directly from the pulp through dentinal fibrillæ, and the pulp responds to injury by a sense of pain, not of touch.

152. Does the dental pulp manifest decided sensibility to the thermal changes?

A. Yes, but it does not determine degrees of temperature or distinguish heat from cold; and it must be aided by the nerves of the lips, gums and peridental membrane to so discriminate.

153. Where does sensitive dentine generally manifest itself?

A. On abraded masticating surfaces, and in carious cavities.

154. From what causes?

A. Exposure and injury or irritation of dentinal fibrillæ.

155. What is the cause of pain when dentine is cut into?

A. The fibrillæ are injured, and these communicating with the pulp, establish the circuit of sensibility to the pulp and through it to the brain.

156. What provision is established by nature to preserve the dental pulp from exposure on gradual loss of covering?

A. The formation of secondary dentine; the pulp shrinking in size, the space thus left is occupied by this secondary formation.

157. What are the safest obtunders of sensitive dentine?

A. Those that confine their action to the superficial layer.

158. With what material should very sensitive teeth be filled?

A. With a reliable non-conducting material; or if gold is used, with a preparatory layer of gutta-percha, asbestos, tin foil, oxyphosphate, etc.

159. In the treatment of sensitive dentine what simple measures are sometimes of service?

A. Use of very sharp burs and excavators, in a direction away from the pulp; application of a burnisher to sensitive surface.

160. What agents are used as obtunders of sensitive dentine?

A. Tannic acid, chloride of zinc, carbolic acid, chloroform, aconite, nitrate of silver, oil of cloves, eugenol, campho-phenique, oil of eucalyptus, cocaine, chloral, thymol, menthol, sesquichloride of chromium, carbonate of potash, crystallized carbolic acid and caustic potash in equal parts, dehydration by warm air, rhigolene spray, and dento-electric cautery.

161. By what means can periodontitis and pulpitis be diagnosed?

A. If periodontitis is present, the tooth is sensitive to touch, and not sensitive to moderate thermal changes; in pulpitis, the tooth is sensitive to touch, but very sensitive to changes of temperature; in reflected pain from pulpitis the tooth is not sore to touch, while radiating pains are absent in periodontitis without pressure of a tooth that is sensitive to touch.

162. Do we have a swelling of soft parts about the tooth in pulpitis?

A. No; such swelling is indicative of periodontitis and alveolar abscess.

163. What does hyperæmia of the dental pulp imply?

A. That its blood-vessels are congested, or too full of blood.

164. What renders the pulp of a tooth susceptible to morbid impressions?

A. Peculiarities of temperament, habit of body, condition of health, condition of tooth structure.

165. What does hyperæsthesia imply?

A. An excessive state of irritability.

166. Does such a condition depend upon any organic change in the tissues of a tooth?

A. It may exist independent of any organic change either in the pulp, dentine or enamel.

167. What is the most common cause of hyperæsthesia of the pulp?

A. Caries; even before it has penetrated to the pulp.

168. What constitutional causes?

A. Impaired digestion and disordered bodily functions.

169. What are local causes of irritability of pulp?

A. Impressions of heat and cold, acids, etc.

170. What is the treatment of irritability of pulp?

A. Remove cause; if from acids, the use of alkaline washes such as bicarbonate of soda, lime water, etc.; if from impressions of cold or heat through a metallic filling, such filling should be removed and either replaced by a non-conducting filling material, or the metallic filling renewed with a preparatory layer of gutta percha, or other non-conductor, covering the sensitive surface.

171. When must treatment be instituted?

A. Before inflammation of pulp has commenced.

172. Why is an inflamed pulp (pulpitis) so excessively painful?

A. Because the pulp is enclosed in a cavity with unyielding walls, where its expansion is impossible, and as its vessels become distended with blood there is undue pressure upon its nerve filaments.

173. Is pulpitis confined to carious teeth only?

A. No; teeth free from caries may be affected as well as decayed ones.

174. What determines the severity of the pain?

A. The structure and condition of the affected tooth, and state of health.

175. Besides irritation of fibrillæ, what are other causes of pulpitis?

A. Contact of irritating matters (carious, for example), mechanical violence, sudden thermal changes (heat and cold conveyed through tooth structure, or through metallic filling), pressure of a filling on thin lamina of dentine, use of improper filling materials, improper use of the teeth, etc.

176. What constitutional symptoms may attend pulpitis?

A. Headache, earache, constipation, full quick pulse, dry skin, furred tongue; due perhaps to impaired health.

177. Is an inflamed pulp amenable to treatment?

A. Yes, in the earlier stage of inflammation when other conditions of the system are favorable, an inflamed pulp will recover if placed in good hygienic condition.

178. What is the treatment of pulpitis caused by an exposed pulp?

A. Cleanse the cavity of all extraneous and irritating matter, syringe with tepid water made alkaline by a little bicarbonate of soda, dry the cavity, and make an application of tincture of aconite; or carbolic acid, glycerine and water; or carbolic acid and chloroform; or a paste of oxide of zinc and carbolic acid; or a five per cent solution of carbolic acid, oil of cloves, oil of cajeput, iodoform, iodol, iodoform and carbolic acid, carefully applied and lightly confined in cavities. If the cause is from the pressure of a filling, this should be removed and the pulp treated as described; for constitutional symptoms when present saline cathartics, blood letting, leeches, etc. If inflammation has not advanced too far, the final treatment is capping the pulp.

179. What are the premonitory symptoms of the inflammation extending from the pulp to the peridental membrane?

A. Uneasiness about the root of the tooth, disposition to press on the tooth which gives relief, a gnawing sensation, and gradually increasing discomfort or pain.

180. When the inflammation of the pulp results in suppuration, how long does it take to run its course?

A. Time varies, generally from three to ten days.

181. When a pulp has died and pus is formed what measure may give relief?

A. Drilling a vent-opening through crown, or through the root, for escape of the pus.

REFERENCE:

See end of Lecture XIV.

LECTURE XIII.

HYPERÆSTHESIA AND HYPERÆMIA OF THE PULP.—EXPOSURE OF THE PULP.—PULPITIS.

182. What is the treatment of hypersensitive dentine?

A. Dryness of cavity, sharp cutting instruments when preparing a cavity, therapeutic agents which do not endanger the vitality of the pulp, such as prepared chalk, bicarbonate of soda, oil of cloves, eugenol, tannic acid, aconite, menthol, chloral hydrate, etc.

183. What is the prognosis in regard to any pain in the region of the face or the ear that is increased by filling the mouth with cold or warm water?

A. That it has its origin in disease of the pulp.

184. What are exceptions to such a rule?

A. Some rarer types of neuralgia of branches of the fifth pair of nerves, also in the early stages of apical pericementitis, caused by expansion of gas of decomposition by warm water.

185. What is hyperæmia of pulp?

A. The over-filling of its vessels with blood; no injury results when it does not exceed a reasonable degree, apparent by an uneasy sensation.

186. Does hyperæmia of the pulp depend upon lesions of the tooth?

A. Generally, but it may occur in a perfectly sound tooth.

187. What is meant by a partially exposed pulp?

A. Where overlying dentine is partly decalcified, and usually more or less discolored.

188. What are the symptoms ?

A. Differ from those of irritated pulps only in degree, and are recognized by extent of decay and touch of instrument.

189. What is the treatment of a partially exposed pulp ?

A. Do not expose the pulp unless necessary, and treat as for an irritated or sensitive pulp.

190. How is the pulp supplied with sensation ?

A. The two or three trunks which enter the apical foramen divide into a number of branches, until the entire tissue is permeated by a rich plexus or network of capillaries immediately beneath the membrana eboris.

191. What is the arrangement of the venous capillaries ?

A. They are somewhat larger than the arteries, and anastomose freely with each other.

192. Name the most common diseases of the pulp.

A. Simple exposure, irritation which includes hyperæmia, inflammation or pulpitis, either acute or chronic ; suppuration, gangrene, fungus growth or polypus ; calcification of its tissues, including nodular deposits and secondary dentine.

REFERENCES :

See end of Lecture XIV.

LECTURE XIV.

HYPERÆSTHESIA AND HYPERÆMIA OF THE PULP.—EXPOSURE OF THE PULP.—PULPITIS.

193. What are the symptoms of an exposed pulp?

A. If simple, no pain except when irritated by foreign matters, and the pulp appears as a small grayish-white or red object in the dentine.

194. What is the treatment of an exposed pulp?

A. Cap with a solution of gutta-percha in chloroform, adding oxyphosphate or oxyphosphate of zinc, and when hard a permanent filling; no pressure should be exerted on the pulp. Some cap pulps with a paste of carbolic acid and oxide of zinc, and over this oxyphosphate of zinc, or pure wood creosote and oxide of zinc in form of paste of consistence of cream, with an oxyphosphate of zinc covering, or lactophosphate of lime paste, or a paste of creosote (or carbolic acid), oxide of zinc and iodoform.

195. What changes does an inflamed pulp present?

A. The normal pinkish-gray color disappears, and a bright red ensues, followed by dark red and purple.

196. What changes occur as to the character of pain?

A. From an unpleasant sensation indicative of hyperæmia, the pain becomes sharp, paroxysmal, then more constant and severe, until it throbs with every pulsation of the heart.

197. What may give some relief at this stage of pulpitis?

A. A slight exudation from distended vessels, or application of cold.

198. What may occur when inflammation reaches its height?

A. Suppuration and death, followed by periodontitis and alveolar abscess.

199. What indicates chronic inflammation of the pulp?

A. Where acute symptoms abate, and the pulp becomes less sensitive, a condition of ulceration.

200. What occurs when the red corpuscles break up, or great extravasation results?

A. The coloring matter passes into the dentinal tubuli, at times to such a degree as to impart a red tinge to the dentine.

201. How may a tooth become much discolored?

A. The coloring matter is thus set free in solution, and enters the tubuli and the formation of sulphurets give the tooth a dark appearance.

202. When pulpitis assumes a chronic form, what is it due to?

A. To a great degree of vitality in the system, giving a resisting power to the progress of disease.

203. May the pulp recover from inflammatory conditions?

A. Yes, where moderate extravasations of blood are absorbed, and where inflammatory lymph is not only tolerated, but the tissues are capable of disposing of it.

204. Why is pain of pulpitis greater at night?

A. Owing to the difference in the blood pressure, which is greater in the recumbent position.

205. What is the treatment of pulpitis?

A. Syringe cavity with solution of carbonate of soda and water to relieve pain; avoid removing any cap of

decalcified dentine present ; local depletion is sometimes resorted to, if the pulp is exposed, relieving the pain with an alkaline solution, then application of an antiseptic to destroy the micro-organisms, such as capping with paste of iodoform, oxide of zinc, and carbolic acid ; then a temporary filling is introduced without pressure.

206. What is the treatment of a wounded pulp?

A. First bathe the surface of the pulp with calendula, or glycerine or eucalyptol, and then cap as in case of exposure by other agents.

207. Is treatment of inflamed pulps universally successful?

A. No, and such systemic affections as anæmia, malaria, scrofula, syphilis, etc., militate against a successful prognosis.

208. What is to be done if a pulp cannot be made healthy or if inflammation recurs?

A. Devitalize and remove it.

209. What causes formation of small abscesses in the substance of the pulp?

A. Suppurative inflammation in cells of the membrana eboris ; deeper in pulp tissue they form by an aggregation of inflammatory products into masses close to each other, which coalesce.

210. In what respect does pain from abscess in the pulp differ from pain of hyperæmia?

A. The onset of the attack is not sudden, but begins with a slight gnawing pain, presistently increasing, until it becomes agonizing, and ceases when strangulation occurs, and in from six to twenty-four hours periodontitis occurs.

211. When a pulp degenerates in structure, that is, mummifies, or dried gangrene ensues, what is it due to?

A. Long continued chronic inflammation, or development of secondary dentine, and consequent stagnation of circulation.

212. Does any decomposition attend a degenerated pulp?

A. No, and the tooth retains its normal color.

213. What is the treatment of putrescent pulps?

A. Peroxide of hydrogen, alternating with iodide of zinc (twenty-four grains or more to ounce of water); also pepsin paste, eucalyptol, crystals of carbonate of sodium, etc.

REFERENCES:

- No. 1. P. 285.
- No. 2. P. 336.
- No. 3. P. 380.
- No. 4. Pp. 215, 217.
- No. 5. Pp. 68, 73.
- No. 6. Pp. 667, 840, 889, 1006.
- No. 7. Pp. 358, 380.
- No. 8. P. 236.
- No. 10. P. 434.
- No. 12. P. 414.

LECTURE XV.

DEATH OF PULP,—DEVITALIZATION.

214. May pulpitis result in suppuration without the formation of alveolar abscess?

A. Yes, abscesses may form in the substance of the pulp, beginning at its surface near the point of exposure, progress until the entire pulp becomes a mass of pus full of micro-organisms.

215. Does dead pulp allowed to remain in a tooth invariably cause trouble?

A. As a general rule it does sooner or later, or although such a tooth may remain quiet for weeks, months, or even years, and the effects in form of suppuration and pain, be manifested as result of thermal changes, exposure to draughts, or wet feet, etc.

216. Should a pulp be devitalized only to relieve pain?

A. No, devitalization should only be resorted to after all other means to relieve the irritation or congestion have failed.

217. Why is the normal living pulp so necessary to the tooth?

A. Because it is a nutrient organ of the tooth, and with the peridental membrane makes up the sensory functions of the tooth.

218. In a case of extreme agony from an irritable pulp, what is the treatment?

A. First, palliative remedies; remove all extraneous matters from the cavity; syringe with tepid water made

slightly alkaline with carbonate of soda, then apply aconite and chloroform combined ; if a careful examination shows the pain not to be due to actual exposure of the pulp, apply either carbolic acid combined with iodoform or acetate of morphia with oil of cloves, and afterwards a capping of iodoform, or carbolic acid and oxide of zinc in the form of a paste, and over the capping a temporary filling of gutta-percha or oxyphosphate of zinc.

219. If the loss of the pulp is inevitable, how may it be devitalized ?

A. Either by the application of a devitalizing agent, such as arsenious acid ; by immediate extirpation or by the application of the actual cautery.

220. When arsenious acid is used how long is it necessary to keep it in contact with the pulp ?

A. From twelve to twenty-four or forty-eight hours, according to the strength of devitalizing combination, the presence of pain on its application and the nature of the tooth structures.

221. How does arsenious acid act on the pulp ?

A. By first exciting the sensory nerves, then paralyzing them, exciting a degree of inflammation in proportion to the quantity of arsenic employed ; the excitement passing away, the arsenic is gradually absorbed.

222. When properly applied after the inflammation has been reduced, what quantity of arsenious acid will devitalize the pulp ?

A. About one-hundredth part of a grain.

223. What is the quantity of arsenious acid employed for devitalizing the pulp ?

A. From one twenty-fifth to one fiftieth of a grain, depending upon the position and character of the exposure, and it is allowed to remain twenty-four hours.

224. After devitalization what should be done with the pulp?

A. Entirely removed with a steel temper-drawn barbed broach: or better, by means of an instrument made of a steel wire filed down to proper size, flattened at extremity, and bent in the form of a hook, and tempered at the hook portion only.

225. How is such an instrument manipulated?

A. By passing it carefully up the canal as far as possible and then rotating it to cut off the connection of the pulp.

226. What is the result from carelessness in permitting arsenic to come in contact with the soft tissues, such as the gum?

A. Extensive sloughing.

227. Is arsenic readily absorbed by organic matters?

Yes, hence the greatest care must be observed in its use.

228. How long a time should elapse after the arsenic has acted before an attempt is made to remove the dead pulp?

A. Some prefer waiting for several days or even a week or more until partial sloughing of the pulp occurs, when it may be removed painlessly.

229. How may the pulp be devitalized and removed with the minimum amount of pain?

A. By the use of local anæsthetics and the galvano-cautery.

230. Why is it necessary to remove the dental pulp from the teeth?

A. To prevent putrefaction, which would ensue on its presence and subsequent periodontitis and alveolar abscess.

231. When is the proper time for filling of the roots after the removal of the pulp?

A. The safest method is to apply an antiseptic dressing to the root-canal such as oil of eucalyptus, eugenol, or eugenol and iodoform, or oil of cloves, and let the case rest for a short time so as to overcome any putrefaction which may occur from a collection of fluid lymph in the canal.

REFERENCES:

See end of Lecture XVI.

LECTURE XVI.

DEATH OF PULP.—DEVITALIZATION.

232. If pulps of deciduous teeth become devitalized what is the treatment?

A. Cleanse the cavity of decay, remove the dead pulp, saturate a pellet of cotton with a 5 per cent solution of carbolic acid 1 ounce, cinnamon or peppermint water 60 drops, place it in the pulp chamber, cover it with piece of rubber dam, and press on it with a blunt instrument, until the fluid appears at the fistulous opening, then dry cavity and canals, and introduce a solution of gutta-percha and chloroform of the consistence of cream, by means of a little cotton on a broach, and work it into the canals with a small smooth broach, then fill the crown cavity with gutta-percha or oxyphosphate.

233. How are deciduous teeth without fistulous openings to be treated?

A. The same as permanent teeth in the same condition.

234. How are pulpless teeth treated where the pulp has recently been devitalized?

A. Freely open the pulp-chamber and bathe it with eucalyptol, eugenol or oil of cassia; then using a smooth broach with a fine hook on the end, remove all portions of the pulp; then disinfect the canals with bichloride of mercury one part to 1000 of water, or iodoform or iodol, and with oil of cloves and eucalyptol (of each one-half ounce); then permanently fill root-canals with gutta-percha.

235. How are pulpless teeth treated where the pulps have been dead for some time?

A. The same as in the preceding case, except that greater care is necessary in cleansing the canals of dead pulp matter, that no septic matter shall be forced through the ends of the roots, and they should be treated with antiseptics for a longer time.

236. How treat pulpless teeth affected with "blind abscesses"?

A. Open the pulp chamber thoroughly and syringe with tepid water; dry the canals carefully and cleanse with peroxide of hydrogen, then dry the canals again and bathe them with eugenol and oil of cassia; or oil of wintergreen; or oil of cassia; or iodoform; or iodol; and pack crown of the cavity loosely with cotton for two or three days, or until the discharge ceases; then tightly pack the root canals with one of the antiseptic drugs named, and fill the crown cavity with gutta-percha for four or five days. If no soreness of the tooth ensues, or if there is no evidence of moisture when canals are wiped out with dry cotton, the canals may be filled permanently with gutta-percha or other material.

237. How are pulpless teeth with fistulous openings treated?

A. Pass a fine, smooth broach through the fistula to determine if there is any roughness about the ends of the roots. If so, they should be smoothed by enlarging fistula by compressed sponge tents, iodoform gauze, or cotton saturated with an antiseptic, and renewed daily; with a fine cut bur of proper size, used in the engine, smooth the rough portions of the roots, and remove any dead bone if present. Use peroxide of hydrogen in the canals, and see that they are opened freely at the ends, and flood the cavity with one of the antiseptics before referred to, and pump it through each canal, if possible, until it appears at the fistulous opening, using fibres of cotton around a fine broach as a piston; or make pressure on a piece of rubber dam placed over a pellet of cotton in the crown cavity sat-

urated with antiseptics ; then pack the canals tightly with cotton saturated with the same, and fill the crown cavity with gutta-percha. After a week or ten days if the discharge continues through the fistula, repeat the treatment. If there is no discharge, treat as you would a case of blind abscess, and fill the canals and crown cavity permanently. Apply rubber dam and open freely into the pulp chamber and root canals before attempting to enter the latter.

REFERENCES :

- No. 1. P. 311.
- No. 4. P. 236.
- No. 5. P. 78.
- No. 6. Pp. 852, 892, 907.
- No. 8. P. 228.
- No. 10. Pp. 438, 712, 722.
- No. 12. P. 436.

LECTURE XVII.

PERIODONTITIS.

238. What is periodontitis or pericementitis?

A. Inflammation of the peridental membrane.

239. What is the nature of this membrane?

A. Very vascular, very susceptible to irritation and inflammation, and highly sensitive when inflamed.

240. What may cause its inflammation?

A. The death of the pulp, and the infiltration of septic matter through the apical foramen; also mechanical violence—as a blow or the biting of some hard substance.

241. Where does periodontitis generally commence?

A. In the apical space at the end of the root.

242. What is the condition of the peridental membrane in the apical space?

A. It is usually thicker than along the root of the tooth.

243. What accounts for the intense pain of periodontitis?

A. The membrane is confined in a bony cavity, and being very profusely supplied with nerves and blood, there is not space for expansion of these when they are engorged and congested.

244. What are the two forms of this affection?

A. Acute and chronic.

245. Describe the symptoms of acute periodontitis.

A. First, uneasiness in the tooth affected; a desire to

press upon it ; a feeling of fullness ; relief as long as pressure is maintained ; then pain of a dull heavy character, elongation of the tooth, owing to the thickening of its investing membrane ; pressure no longer relieves but is painful ; the gums assume a deep red color, instead of the normal pale rose hue ; and become congested and swollen.

246. How may periodontitis be diagnosed ?

A. By pressure or light blows on the affected tooth.

247. How does periodontitis differ from pulpitis ?

A. In that it is not generally affected by thermal changes, and pressure on the tooth crown apart from the pulp will cause pain in periodontitis.

248. What distinguishes chronic periodontitis ?

A. It is a modified form of the acute, and may be limited to the soreness of the tooth only and slight annoyance, or it may be attended with considerable congestion and sensitiveness when the tooth is pressed upon, subsiding and reappearing.

249. Name the causes of periodontitis.

A. Inflammation of the pulp resulting in its death ; salivary calculus, improper use of arsenious acid ; action of mercurial remedies, mechanical violence ; too close proximity of a metallic filling to the pulp ; loss of antagonizing teeth ; overhanging portions of metallic fillings in proximal cavities ; constitutional causes, such as malaria, syphilis, rheumatism, scrofula, etc.

250. What is the treatment of periodontitis ?

A. Remove all irritating matter from the pulp canals, applying counter-irritants to the gum over root, such as tincture of aconite and iodine paint and chloroform in equal parts, local blood-letting by lancet or leeches ; in the latter stages of the disease raisins or figs saturated in hot milk may be applied ; syringe the pulp canal with warm

water, treat the pulp canals with ethereal solution of iodoform, or iodoform combined with oil of cassia or eugenol; or eucalyptus, oil of sanitas, etc. Cantharidal collodion may also be used as a counter-irritant; saline cathartics to relieve congestion, morphine to relieve intense pain. In malarial districts, quinine; tonics are also indicated in some cases.

REFERENCES :

- No. 1. Pp. 94, 322.
- No. 4. P. 250.
- No. 5. Pp. 88, 93.
- No. 6. P. 918.
- No. 8. Pp. 259, 272.
- No. 10. P. 439.
- No. 11. P. 33.
- No. 12. P. 446.

LECTURE XVIII.

ALVEOLAR ABSCESS.

251. Why is an abscess connected with a tooth called an alveolar abscess?

A. Because the collection of pus is within the alveolar cavity in the form of a sac adhering to the root of the tooth.

252. Is the seat of abscess invariably at the apex of the root?

A. Not always. Besides being in the apical space, it is sometimes at the side of the root, or, in the case of molars, in the bifurcation of the roots.

253. Describe the manner in which an alveolar abscess is formed.

A. The peridental membrane being the seat of abscess, plastic lymph is effused, which is condensed into a sac, and the accumulation of pus within the sac causes it to distend, which exerts pressure on the bone surrounding it, bringing about absorption to accommodate the increasing quantity of pus, which finally makes its way to the surface, usually by a fistulous opening through the bone and soft tissues.

254. Does alveolar abscess ever result in necrosis of the bone?

A. Yes. When the pus burrows between the periosteum and bone and separates the two, the septic matter thus brought into contact with the bone causes necrosis.

255. What other results may occur?

A. The pus may invade the duct of a salivary gland and cause salivary fistula, or cause inflammation of the

tonsils when the abscess affects an inferior third molar ; or, invading the muscles of the cheek and neck, cause trismus.

256. Describe the progress of acute alveolar abscess from its inception to full development.

A. It begins in the apical space, usually by infiltration of irritant or septic matter through the apical foramen of the tooth, affecting the peridental membrane, the poison existing in the form of gases or septic material generated by decomposition of the pulp of the tooth after its devitalization. The first symptom is acute inflammation of the investing membrane about the apical foramen, beginning with a sense of uneasiness, pressure and slight pain, succeeding by elongation of the tooth from thickening of the inflamed peridental membrane, pain on pressure, the inflammatory condition manifesting itself in the gum over the affected tooth ; violent throbbing pain, with increased redness ; heat tension and swelling follow, lasting till the escape of pus.

257. What are the constitutional symptoms ?

A. Fever, hot dry skin, coated tongue, prostration, constipation, and violent pain in the cheek and face.

258. What symptoms characterize chronic alveolar abscess ?

A. It may result from a long continuance of the acute form, or commence with less active symptoms ; the pain is less severe, but more enervating, more diffused discoloration, more extended œdema, infiltration of pus into the adjoining tissues, gradual subsidence of such symptoms upon the establishment of a fistulous opening.

259. What effect has the pus of an abscess upon the bone of the alveolar process ?

A. The bone is absorbed for the enlargement of the abscess.

260. Name points of escape of pus of an abscess.

A. Through alveolar wall, apical foramen, root canal, crown cavity, alongside of root to free edge of gum, through process into antrum or nose, the face, etc.

261. How may a fistulous opening be established ?

A. By closing the canals or the crown cavity, and hastening suppuration : by making an opening through the tissues opposite the sac of the abscess, and lancing the soft tissue, and by applying heat to the gums directly over the location of the abscess.

262. By what treatment may an alveolar abscess of a lower molar be prevented from opening on neck or face ?

A. By lancing freely to evacuate the pus through the gum ; by supporting the external parts with a bandage or compress to change the direction of the pus ; by stimulating internally until an internal fistula is established, or by extracting the tooth.

263. What is the result of an abscess discharging on the face ?

A. An unsightly scar.

264. What is the surgical treatment of an alveolar abscess ?

A. Make an incision in the gum externally to the apex of the root and walls of abscess cavity or sac; into this opening introduce a bur attached to a dental engine, cut through the alveolar wall and break up the sac, and also cut off the end of the root of the tooth as smoothly as possible; if there is any necrosed bone present remove it also; then syringe the cavity with peroxide of hydrogen or this combined with bichloride of mercury; also aromatic sulphuric acid.

265. What is the treatment of the different forms of alveolar abscess ?

A. For simple cases, removal of septic matter from pulp-chamber and canals; in acute cases evacuate the pus through the tooth as soon as possible, and allow the parts to rest and recover from the soreness, then the use of some antiseptic placed in the pulp canal on a pledget of cotton, tight enough to exclude saliva; the cavity may be opened from time to time for the discharge of pus, if necessary; if pain returns open the canal and treat as before.

REFERENCES :

- No. 1. Pp. 311, 327.
- No. 4. Pp. 45, 264.
- No. 5. Pp. 103, 106, 120.
- No. 6. Pp. 855, 929.
- No. 8. P. 268.
- No. 11. P. 161.
- No. 12. P. 452.

LECTURE XIX.

PYORRHŒA ALVEOLARIS.

266. What is pyorrhœa alveolaris?

A. Alveolar pyorrhœa, commonly designated "Riggs' disease," denotes suppurative inflammation of the gums, attended with the destruction of the alveolar processes. It usually commences with an uneasy sensation in the gums and teeth, which soon become painful.

At an early stage of this disease the margin of the gum presents decided inflammatory action, and bleeds from slight causes.

As the disease progresses, the inflammation extends deeper into the substance of the gum, which becomes greatly congested with venous blood, swollen, and exhibits a tendency to separate from the necks of the teeth, which give rise to the formation of small sulci filled with pus. There is also a loss of substance of the gum, and the destruction of the margins of the alveolar processes is followed by the death of the thicker portions beneath, and, as a consequence, the teeth become loose and change their positions. There is frequently a separation and protrusion of the superior and inferior front teeth, with a thick, fetid discharge from about their necks, which causes a disagreeable taste and a very offensive breath. The gum at this stage of the disease is of a dark purple or livid hue, with a congested margin, and in some cases, on account of its being denuded of its epithelium, its surface presents a polished appearance; it may also become granular, and covered with fungous excrescences. At an extreme stage of the disease, complete destruction of the alveoli, and of a considerable portion of the gum occur.

Although the two forms of calculus—the salivary, which is derived from the saliva, and the sanguinary, from the serum that exudes from the gums when diseased—cause inflammation of the peridental membrane, yet the latter form of calculus appears to be more commonly associated with this suppurative inflammation than the former.

267. What causes the disease?

A. Alveolar pyorrhœa is a disease due to certain unknown constitutional causes aggravated by local conditions. It is said to be due to a gouty or rheumatic diathesis, and is thus classed as one of the diseases due to derangements of the functions of the kidneys.

268. Give the treatment.

A. In the early stages all salivary deposits should be carefully removed, and the surfaces beneath well polished. In the more advanced stages, the treatment consists in reaching, by means of a narrow, sharp instrument, the extreme limits of the diseased action, removing all deposits, and breaking up all the diseased tissue and necrosed bone, and polishing the surfaces roughened by depositions of calculus.

The diseased margin of the alveolar process must be removed to such an extent that the firm and resisting bone is reached by the edge of the cutting instrument, which a nice sense of touch will determine.

The operator should distinguish, with the instrument, foreign and dead substance from tooth structure and living bone. It is especially necessary that every particle of salivary calculus and necrosed bone should be removed. Application of dilute aromatic sulphuric acid is made to promote the reproduction of new bone. Dilute solution of chloride of zinc may be applied to the ulcerating surfaces by passing it under the gum, about the necks and roots of the teeth, by means of cotton wound on a broach, and alternating with dilute aromatic sulphuric acid and tincture of iodine applied to the surface of the

gum. Chlorate of potash solution should be used as a mouth wash after each meal and at night, with as thorough use of the toothbrush as the condition of the gums will permit.

For the acute form, the pockets formed by the separation of the gum should first be filled with iodoform and eucalyptus, iodoform and oil of cinnamon, or be thoroughly syringed with a one to three grain solution to the ounce of water, of chloride of alumina, which is a good disinfectant and astringent. In three or four days the sanguinary deposits may be removed, as well as the edges of the alveoli. The pockets should then be syringed with peroxide of hydrogen, for the purpose of thoroughly cleansing them and also to destroy the micro-organisms present. After drying the gums, the pockets should be injected with a solution of iodide of zinc, twelve to fourteen grains to the ounce of water, two or three drops or more to each pocket. After several days have elapsed, the gums should be carefully dried, and a fine cone of cotton or bibulous paper moistened with peroxide of hydrogen gently pressed into each pocket; repeating this several times, then inject the iodide of zinc solution. In very bad cases, a stronger solution of the iodide of zinc is recommended, xxviii grs. to the ounce of water; and when the margins of the gums present a ragged border or cone-shaped slit, pure granular iodide of zinc is applied to the edges of the slit once in three days, the injection into the pockets being repeated every fourth day. Combinations of iodoform and eucalyptus; iodoform and oil of cinnamon; iodoform and eugenol, chloride of aluminum in the form of a solution composed of one to three grains to ounce of water; sanitas, three parts to one part of eugenol, have also been employed with benefit, in the form of paste and injection once in four days.

A strong solution of chloride of zinc, 20 to 30 per cent, applied with care about the teeth by the means of an abscess syringe, will prove beneficial by relieving the con-

gestion and constringing the soft tissues. The after treatment consists in the use of stimulating applications, such as cinnamon-water, or carbolic acid combined with oil of cinnamon and oil of gaultheria, in proportion of one drachm of the former to four or five drachms each of the latter.

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- No. 1. P. 238.
- No. 3. P. 321.
- No. 4. P. 271.
- No. 5. P. 108.
- No. 6. P. 954.
- No. 7. Pp. 445, 476.
- No. 8. P. 278.
- No. 12. P. 696.

LECTURE XX.

ODONTALGIA.

269. What is odontalgia?

A. Odontalgia is the name used to indicate pain in or around a tooth or teeth.

270. Classify the disease.

A. Odontalgia may be classified under two headings, viz., (1) local, (2) referred. By local odontalgia is meant pain in or around teeth which are themselves the cause of the trouble; referred odontalgia is pain in a tooth which is not itself the seat of the cause.

271. What causes odontalgia?

A. Nearly all morbid conditions of the teeth may be cited as causes of local odontalgia, and for convenience can be grouped under (1) morbid conditions of the tooth pulp; (2) morbid conditions of the alveolar periosteum. The principal affections under the first head are irritation, acute and chronic inflammation, and under the second, acute and chronic periodontitis and its terminations. Local odontalgia may be acute or chronic, and for practical purposes the source may be considered to be either pulp or periosteal.

272. What is acute local odontalgia due to?

A. Acute local odontalgia is generally due to either acute inflammation of pulp or peridental membrane.

273. Give the treatment.

A. The treatment of acute local odontalgia depends

upon the cause, and the remedy for each morbid condition should be resorted to.

274. What are the causes of chronic local odontalgia?

A. The causes of this, like those of the acute form, may be either pulp or periosteal, and under the former group, chronic inflammation and hyperæmia are common causes, while under the latter is chronic periostitis, especially that form which terminates in organization (exostosis).

275. Classify referred odontalgia.

A. Referred odontalgia may arise from many causes, and these may be classified as follows :—(a) peripheral, (b) central or cerebral, (c) systemic or general.

Peripheral—Any conditions which may give rise to irritation of the terminal portions of the fifth pair of nerves and its connections may cause reflex odontalgia, and by far the commonest under this heading is that which is dental in origin, namely, where the cause is another tooth, which itself is not the seat of pain.

A few cases of odontalgia, pointing to a cerebral origin, have been recorded—in some pain was apparently due to a cerebral abscess. Hysteria seems undoubtedly to be a cause of odontalgia, or, in other words, odontalgia may be a manifestation of hysteria.

Systemic or general origin—Malaria, gout, rheumatism and syphilis may cause odontalgia, but in the majority of cases they act simply as predisposing causes. People inhabiting malarial districts are certainly liable to distinct periodic attacks of odontalgia, which are only relieved by quinine and like remedies.

REFERENCES :

- No. 1. P. 304.
- No. 4. P. 358.
- No. 8. P. 336.
- No. 10. Pp. 437, 694.
- No. 12. P. 533.

LECTURE XXI.

NEURALGIA.

276. What is neuralgia?

A. Neuralgia, on the other hand, means pain in the course of a nerve, or in the area of its distribution; when therefore, occurring in the course of the fifth nerve, it is generally termed trigeminal or trifacial neuralgia. In some instances neuralgia seems to be hereditary; it is also predisposed to by the neurotic temperament, overwork and fatigue, which probably act by producing lowered vitality on living in cold, damp atmospheres.

277. Give the exciting causes.

A. (1) Peripheral, due to irritation of the terminal parts of the fifth nerve or any of its terminations. Under this heading are included—(*a*) morbid conditions of the pulp, such as chronic inflammation and degeneration; (*b*) morbid conditions of the alveolar periosteum, such as inflammation and its termination, especially when ending by the formation of exostosis; (*c*) morbid conditions of the gums and mucous membrane of the mouth, nose, etc.; (*d*) morbid conditions of remote parts, such as the uterus.

(2) Causes affecting the nerve in its passage from the brain to its terminations, including—(*a*) injuries from contusion and laceration; (*b*) pressure from impaction of lower third molars, periostitis of the bony canals, and presence of tumors; (*c*) implication of nerve in syphilitic gummata, carcinomatous and other tumors and inflammations.

(3) Cerebral or central causes, such as sclerosis and other degenerative affections of the nervous centres.

(4) Constitutional—malaria, anæmia, and hysteria.

(5) Many cases are apparently idiopathic.

278. What is the symptom?

A. The characteristic symptom of neuralgia is pain of a boring, shooting, or burning character. It is nearly always paroxysmal in form.

279. What is the diagnosis?

A. The patient should be questioned as to the character of pain to discover whether it arises from the pulp or periosteum. It is also important to ascertain whether it is periodic; while at the same time, the situation of the pain is important in assisting to localize the position of the tooth, should the neuralgia be due to one.

280. What is the treatment?

A. If the neuralgia is due to any dental cause it must be removed by measures indicated for the treatment of such lesions. When the cause can be traced to some constitutional condition, this must be dealt with by appropriate remedies. For instance, if arising from general debility, anæmia, or overwork, a general tonic treatment with such drugs as iron, quinine and arsenic will prove useful, careful attention being paid to the condition of the bowels. If of malarial origin quinine in large doses, such as gr. v., will be found to bring immediate relief, and if given before an attack will in some cases ward it off, while in others it will greatly minimize its severity. Should there be any suspicion of syphilis, iodide of potassium will be indicated; while with gout and rheumatism the same drug may prove useful. In addition to the internal administration of drugs, local applications may be tried, such as chloral and camphor, equal parts, aconite and chloroform, or counter-irritants, such as cantharides, capsicum and mustard.

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LECTURE XXII.

DENTAL CARIES.

281. What is dental caries?

A. A gradual softening and disintegration of the tooth structures.

282. What is the first appearance of caries?

A. A chalky, opaque spot in the enamel which gradually breaks down, involving the dentine, in which the carious action is more rapid.

283. What is the treatment of dental caries?

A. Preventive : Proper care of the teeth from time of their eruption by the employment of a soft or medium tooth brush and water after each meal, and the use of good dentifrice upon arising in the morning, and just before retiring at night, with such adjuncts as floss silk or quill tooth-picks. An antiseptic mouth wash is also serviceable. The treatment of carious cavities consists in the removal of the carious matter when it is superficial, and properly preparing the surface by polishing, etc. For deep cavities the entire removal of the carious matter, and the insertion, after due form has been given to the cavity, of a permanent filling material.

284. What mouth washes are often used as adjuncts?

A. Alkaline, such as lime-water, borax or bicarbonate of soda, to neutralize any acidity of oral fluid.

285. What effect has sex upon susceptibility to caries?

A. Teeth of females are more prone than those of males.

286. What is the etiology of dental caries?

A. A gradual softening and disintegration of the tooth structures, appearing first as a chalky, opaque spot in the enamel, and caused by an acid or otherwise abnormal condition of the secretions of the mouth; the product of fermentation of particles of food, or from systemic conditions, the progress assisted by micro-organisms.

287. What acids are most injurious to tooth structure?

A. Nitric, sulphuric, hydrochloric and lactic.

288. What acids are most commonly found in the mouth?

A. Hydrochloric and lactic.

289. What form of dental caries is indicative of the presence of nitric acid?

A. White and extremely sensitive, the organic as well as the inorganic structures being destroyed.

290. What form, of sulphuric acid?

A. Black, sensitive and slow in progress.

291. What form, of hydrochloric acid?

A. Brown, the inorganic matter being destroyed, and the organic remaining.

292. What form, of lactic acid?

A. A light form, less sensitive than that caused by nitric acid.

293. What surfaces of the teeth are most prone to caries?

A. Proximal surfaces.

294. What effect has illness upon susceptibility to caries?

A. When severe, the conditions influencing attacks of caries are want of proper nutrition, acid secretions and free fermentation on account of uncleanness.

295. What are predisposing causes of caries?

A. In contradistinction to the exciting causes of caries, we characterize as predisposing such conditions of individual or all the teeth which divest them of all their normal power of resisting exciting causes, or by which they offer them especial points of attack.

1. The structure of the teeth plays the most important part as a predisposing cause of dental caries. Poorly developed, soft, porous teeth, with many large inter-globular spaces, are highly predisposed to caries. As a lump of table salt dissolves more rapidly in water, on account of its porosity, than an equally large piece of rock salt, porous dentine is more rapidly decalcified than well-developed, firm dentine, because the acid may more readily penetrate the tissue, and because less acid is required to decalcify a porous than a hard tooth.

2. The second predisposing factor is the abnormally deep fissure or the blind holes (foramina coeca) in molars and superior lateral incisors, especially in cases where the enamel also is poorly developed.

3. In the third place, fissures or cracks in the enamel are regarded as predisposing causes.

4. In the fourth place, teeth are predisposed to decay by a crowded, irregular position.

5. A recession or loosening of the gums from the neck of the tooth not only lays bare the dentine, but also permits the entrance of food-particles between the necks of the teeth or into the pockets formed by the loosening of the gums, by which means a further predisposing cause for caries is furnished.

6. Many consider pregnancy as a predisposing cause.

7. Many believe that a predisposition to caries may be inherited.

8. Other predisposing causes are various general diseases, as rheumatism, gout, diabetes, gastro-enteritis, dyspepsia, cancer of the stomach, scrofula, rachitis, and tuberculosis.

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LECTURE XXIII.

NECROSIS OF THE JAWS AND TEETH.

296. What are the causes of necrosis?

A. The principal exciting causes are: (1) extension of inflammation from diseased teeth or the antrum; (2) escape of arsenious acid used for devitalizing a pulp, upon the gum or through the apex of the tooth; (3) direct violence from blows or careless extractions; (4) specific inflammations, such as cancrum oris or ulcerative stomatitis; (5) inhalation of the fumes of phosphorus or mercury, the former occurring in lucifer match makers and the latter in looking-glass makers; (6) administration internally of such drugs as mercury; (7) the exanthemata; (8) the presence of tuberculous deposits predisposing to inflammation; (9) syphilis, by giving rise to an osteoplastic otitis, or by the presence of gummatous deposits; (10) malignant disease, such as epithelioma or sarcoma; (11) in many cases it is apparently idiopathic.

297. Give the diagnosis.

A. It is likely to be confounded with epithelioma of the gums which has spread to the antrum (creeping epithelioma), or it may be mistaken for sarcoma. Dead bone can be recognized by the fact that a probe passed down a sinus, and impinging upon the bone, will give a grating sensation. In children the sequestrum frequently involves the permanent teeth, while in cases of phosphorus necrosis it presents a peculiar appearance known as the pumice stone deposit, which will be referred to subsequently.

298. Give the treatment.

A. In the early inflammatory stages any local cause should be removed and local depletion carried out by either scarification or leeches, and hot poppy fomentation applied. A good purge must be given, and, in addition, large doses of iodide of potassium, opium being added when there is much pain. Should destruction of the bone seem probable, free incisions must be made to relieve tension, while loose teeth should be removed. The health must be supported, and if solid foods cannot be taken, fluids must be given. If the bone is necrosed but immovable, the case should be left alone for nature to throw off the sequestrum. If more than one sinus exists, they should be connected and deodorant mouth-washes prescribed. Directly the bone is loose, it must be removed with suitable instruments. When necrosis involves large portions of the jaw, surgical interference may be called for, but should not be carried out until the new bone developed from the periosteum is sufficient to maintain the form of the jaw.

299. What is phosphor necrosis?

A. It is an acute and severe form of disease and may affect both jaws, though usually only one at a time. For the phosphorus to attack the bone, there must be some communication from the surface to the deeper parts of the bone; this is generally through a dead tooth or the socket of a recently extracted one. The action of phosphorus fumes must be prolonged, and be under particular conditions of temperature. The disease is prevalent in those employed in manufactories connected with phosphorus, and was formerly common amongst lucifer match makers.

300. What are the symptoms?

A. The symptoms of this disease generally commence with toothache, which is at first local and constant, and later becomes more severe and erratic, the pain shooting to the side of the head and towards the shoulder. The disease is at first subacute. The gums become swollen

and livid, the swelling and tenderness increasing, and supuration eventually takes place. The skin over the part becomes red, tense and distended. Bronchial and pulmonary symptoms from irritation may develop, while later, during the advent of suppuration, there is often well marked pyrexia, accompanied by rigors. The sufferings of the patient are much mitigated by the discharge of pus.

301. What is exanthematous necrosis?

A. This is a disease which follows the exanthemata. It generally occurs between the ages of three and eight, being most frequent between the ages of five and six. It usually starts within the fourth or fifth week following convalescence from the fever, although it may be as late as the eighth or ninth. It seems especially prone to follow scarlet fever; less frequently, measles, smallpox, typhus, or typhoid.

302. What are the symptoms?

A. In this form of necrosis, swelling and pain are, as a rule, not so marked as in some of the other varieties. The gums become stripped off from the margin of the jaw, leaving the alveolar border bare. From the margin of the gum pus oozes, and the peeling of the gum progresses in a vertical and not in a lateral direction, until the sequestrum becomes loosened, and is easily removed. There is no thickening, or effort to form supplemental bone. The breath is generally fetid, and there may be some rise of temperature. One side generally starts a little time after the other.

303. What is necrosis of teeth?

A. Death of the entire organ, both pulp and peridental membrane.

304. What are common causes?

A. Death of pulp, mechanical violence, mercury, debilitating diseases, impaired nutrition rendering the tooth loose, loss of vascular supply, and great discoloration.

305. What is the remedy for a necrosed tooth?

A. Extraction.

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LECTURE XXIV.

THE ANTRUM.

306. What is the chief antral disease coming under the notice of the dentist?

A. Suppuration in the antrum.

307. What are the causes?

A. The result of acute or chronic inflammation of its lining membrane, which is a tissue similar to that of the nose. The causes giving rise to this condition are: (1) Extension of inflammation from the roots of the teeth, generally from the first or second molar; (2) extension of inflammation from the nasal cavity; (3) injury, such as blow on the cheek; an instance is recorded in an infant two weeks old of its occurrence as a result of pressure during birth; (4) an abscess burrowing into the cavity, the origin of the abscess being in some other part of the maxilla; cases of abscesses in connection with centrals, laterals, and cuspids opening into the antrum have been recorded; (5) presence of a foreign body in the cavity, such as a tooth, piece of steel, or portion of drainage tube.

308. What are the symptoms?

A. An early symptom of suppuration in the antrum is a dull, deep-seated pain shooting to the forehead and over the face; but the pain may be of a stabbing, neuralgic character. Tenderness in the region of the malar bone, with slight redness, swelling, and heat of the soft parts, is generally present. In acute cases general febrile symptoms may be present accompanied by a rigor. As the pus forms it makes its way through the opening into the nose,

this being especially marked when the patient lies upon the opposite side of the face. The fetid odor arising from the discharge is apparent to the patients themselves, and not always to those around, thus differing from ozena; but it must be remembered that suppuration in the antrum is often associated with ozena.

309. Give the diagnosis.

A. The diagnosis of suppuration in the antrum is not as a rule difficult. A purulent discharge from the nose, accompanied by a dull, deep-seated pain, is always suspicious of antral suppuration, and the principal other trouble for which it is likely to be mistaken is ozena; but as mentioned above, in the latter the breath is offensive to bystanders, but not to the patient, while the contrary is the case in suppuration of the antrum. The presence of diseased teeth in the molar or bicuspid region would assist in the diagnosis, while, in doubtful cases, illumination of the antra by an electric light in the mouth (the patient being in a totally dark room) will considerably assist. The antrum, under these circumstances, when diseased, appears opaque, but if healthy, translucent. When the suppuration is complicated with bulging of the walls, it will be necessary to diagnose firstly, from solid growths, and then from the fluid swelling caused by dental cysts, dentigerous cysts, and cysts of independent formation. In all cases where the contents are fluid, there is fluctuation. The consciousness of the patient regarding the movement of the fluid aids diagnosis.

310. Give the treatment.

A. The treatment of suppuration in the antrum is to give free vent to the pus, thoroughly drain the cavity, in the same way as in the case of suppuration in other parts. For giving vent to the pus it will be needful to "tap" the antrum at some point. If diseased teeth are present, these may be removed, and the antrum perforated through the socket of the extracted tooth; and when possi-

ble that of the anterior buccal root of the first molar should be chosen, because this root opens into the antrum more frequently than any other. It may be necessary to make an opening through the bone with a bur in the engine. Having obtained the opening, the cavity must be well syringed with some antiseptic, and if the disease is acute the cavity must be allowed to drain, to permit of being carefully syringed out at first twice and subsequently once a day. In treating chronic cases, syringe the antrum with carbolic acid, about one to twenty of water, or chloride of zinc, one or two grains to the ounce of water. A metal drainage tube should be made.

All diseased teeth should be placed in a normal condition.

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- No. 11. Pp. 15, 59.
- No. 12. P. 508.

LECTURE XXV.

MISCELLANEOUS.

311. Describe ulceration of the gums of children attended with exfoliation of the alveolar processes.

A. Among the symptoms which characterize the affection, are itching and ulceration of the gums and their separation from the necks of the teeth and alveolar processes; there is, at first, a discharge of muco-purulent matter from between the gums and necks of teeth, which ultimately become ichorous and fetid. The teeth loosen, and the alveoli lose their vitality and exfoliate. Ulcers are formed in various parts of the mouth, and the gums and lips assume a deep red or purple color. In the exfoliation of the alveolar processes, the temporary, and sometimes the crown of the permanent teeth are carried away. The constitutional symptoms are: skin, for the most part, dry; pulse, small and quick; the bowels generally constipated, though sometimes there is diarrhœa; and to these symptoms may be added lassitude and a disposition to sleep.

312. What causes the disease?

A. The disease seems to be the result of general debility or defective nutrition and a cachectic habit of body. It appears to be almost wholly confined to children of the poor and destitute, and as a general rule the affection attacks only those who reside in cellars or small and confined apartments.

313. Give the treatment.

A. The local treatment should consist of acidulated and astringent gargles. The ulcerated parts may be occasion-

ally touched with a solution of nitrate of silver, or chloride of zinc, from three to eight grains to the ounce of water ; phenol sodique or permanganate of potash solution may be employed to correct the fetor. As soon as the alveolar process exfoliates, it should be removed. After this takes place, a cure is generally speedily affected under proper constitutional treatment. This last may consist of mild alteratives, a generous nutritive diet, consisting of succulent vegetables, and, in the absence of fever, of wholesome meats, tonics, and exercise in the open air.

314. What is mucous deposit on the teeth?

A. While persons of all ages are subject to deposits of salivary calculus, there is a mucous deposit, to which the teeth of children are especially liable, in the form of a brown or green stain, which has erroneously been called green tartar. This deposit is generally found upon the labial surfaces of the front teeth, more especially upon those of the upper jaw, and varies in color from a light brown to a dark green. From its not collecting upon the posterior teeth and upon the lingual surfaces of the inferior front teeth opposite the mouths of the ducts leading from the salivary glands, there is every reason to conclude that this deposit is not precipitated by the saliva, and hence is altogether different in its origin from salivary calculus. It is generally considered to be a deposit from the mucus, when this secretion is in a more acid condition than is natural. From its effect upon the teeth, when it is allowed to remain on them for a considerable time, and also from the fact that it is most abundant when the mucus is secreted in large quantities and of a decided acid reaction, there is little doubt as to its origin from this secretion.

315. What is the effect upon the teeth?

A. In regard to the effect of this mucous deposit upon the teeth, while salivary calculus tends to preserve the portion of tooth-structure upon which it is precipitated, this green stain so erodes the enamel that decay advances in

the part which it covers, more or less rapidly, according to the quality of the teeth and the length of time it is allowed to remain.

316. What is the treatment ?

A. Where the erosion caused by this mucous deposit is but slight, it may be removed by Arkansas or Superior stones, or by finely powdered silax or pumice stone and water applied upon a stick of hard, fine grained wood such as orange wood or hickory; the point of the piece of wood being so formed as to adapt it well to the surface on which it is used. The wood points or small brushes, or soft rubber cups charged with either of the powders referred to and rotated by means of the dental engine, will prove very serviceable for such an operation. After all the discoloration is removed by the means just referred to, the surface should be well burnished with a steel burnisher and a solution of pure castile or white Windsor soap. When, however, the effects of this mucous deposit are more serious, the enamel not only being discolored but deeply eroded, it is necessary to make use of the corundum point rotated by means of the dental engine, the enamel chisel, or file, to remove the injured surface.

317. What is sanguinary calculus ?

A. Composed principally of lime salts colored by hæmatin, which accounts for its crystalline form.

318. What is its origin ?

A. It is precipitated from the liquor sanguinis of the blood upon its disorganization, in the form of dark granules.

319. What is its consistence ?

A. It is much harder than salivary calculus, and adheres more firmly to the teeth, being a result of inflammatory action leading to suppuration.

320. When is it most abundant ?

A. When the mucous is secreted in large quantities, and is in a very acid condition.

321. What is its color?

A. It varies from a grayish brown to a dark green.

322. How is it best removed?

A. By means of scalers.

323. What is Phagedenic Pericementitis?

A. A specific inflammation, infectious in character, which begins in the gingival borders and results in destruction of the peridental membrane and alveolar walls. It is of the fungoid type.

324. What is the treatment?

A. With a curved bistoury cut into the margin of the gum within limit of healthy tissue, then through the alveolar process and dissect up the tumefied line, scrape the margins of the cavity and cauterize several times with carbolic or chromic acid; internally use mild stimulants and tonics.

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No. 6. Pp. 954, 968.
No. 12. Pp. 261, 684.

LECTURE XXVI.

MISCELLANEOUS.

325. What is Hypercementosis?

A. Hypertrophy of the cementum of the tooth.

326. What is its effects?

A. Great enlargement of the roots, causing neuralgic pains and interfering with the extraction of the affected teeth.

327. Where is the enlarged portion generally located?

A. Near the apex of the root, but it may be on any part of the cementum, and of different forms.

328. What is the cause?

A. Local (or as some contend), also constitutional irritation of the peridental membrane; also from effects on that membrane, of occlusion. Syphilis is also supposed to induce the affection.

329. What is the treatment?

A. Iodide of potassium is recommended in the earlier stages, but extraction is generally resorted to.

330. How may discolored teeth be bleached?

A. Remove all discolored dentine, and apply to the cavity either chlorinated lime saturated with acetic acid, one part, and water eight parts; or wash out the cavity repeatedly with peroxide of hydrogen, and dry with hot air; or place a little aluminum chloride in the cavity and saturate it with peroxide of hydrogen; or bathe the cavity

with a solution of permanganate of potash, and then use alternately a four per cent solution of sulphuric acid and Labarraque's solution of chlorinated soda, and repeat for a short time ; or one hundred grains of sodium sulphite and seventy grains of boracic acid, dry, and grind together in a mortar, place some in the cavity and add a drop of water ; or sodium sulphite one hundred grains, boric oxide fifty-five grains, and mix and use as above. The root and cavity should be filled with oxychloride of zinc.

331. What are pulp nodules ?

A. The formation of small nodules of secondary dentine within the pulp cavity, usually in the body of the pulp, at times in the root portions ; pains are neuralgic in character, or infra-orbital neuralgia, with paroxysms in one or more teeth.

332. How may their presence be diagnosed ?

A. Where evidence exists of no other affection, cold water and percussion may locate the tooth affected.

333. What is the treatment ?

A. Drill into the pulp chamber and devitalize, and remove the pulp, fill canals, etc.

334. What is secondary dentine ?

A. Dentine formed after the tooth is fully developed.

335. In what does it differ from true dentine ?

A. The tubuli are very irregular, no centre of radiation as in normal dentine, and more like canaliculi of bone ; formed as a continuation of primary dentine, sometimes to such a degree as to entirely obliterate the pulp ; in other cases as nodules in the substance of the pulp ; in the former cases it is protective.

336. What is the cause of its formation ?

A. Irritation of the pulp from the abrasion in mastication.

tion, force of occlusion, or a blow, erosion or irritation from pulp capping, filling, etc.

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